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WHAT IS CLAIMED IS

1. A high-side transistor driver, comprising:

a high-side transistor;

a low-side transistor;

a floating-ground terminal, connected to a source of said high-side transistor;

a floating-supply terminal, for providing a floating voltage for the high-side transistor driver;

a charge-pump diode, having a cathode connected to said floating-supply terminal, wherein an anode of said charge-pump diode is supplied with a bias voltage;

a bootstrap capacitor, connected in series with said charge-pump diode, wherein a negative terminal of said bootstrap capacitor is connected to said floating-ground terminal, and wherein a positive terminal of said bootstrap capacitor is connected to said floating-supply terminal;

a p-transistor, having a source connected to said floating-supply terminal;

an n-transistor, having a source connected to said floating-ground terminal, wherein a gate of said n-transistor is connected to a gate of said p-transistor, wherein a drain of said n-transistor forms a junction with a drain of said p-transistor, and wherein the voltage at said junction drives a gate of said high-side transistor; and

a current sink, connected from the gate of said n-transistor to said floating-ground terminal.

2. The high-side transistor driver as claimed in claim **1**, wherein said bias voltage will charge said bootstrap capacitor whenever said low-side transistor is turned on, wherein said bias voltage will supply said floating voltage at the floating-supply

terminal whenever said low-side transistor is turned on.

3. The high-side transistor driver as claimed in claim 1 further comprising:

a control p-transistor, having a source connected to said floating-supply terminal, wherein said control p-transistor has a drain coupled to said gate of said n-transistor;

a first current source connected from said floating-supply terminal to a gate of said control p-transistor;

a first diode, having an anode connected to said floating-ground terminal, wherein said first diode having a cathode connected to said gate of said control p-transistor;

an on/off transistor, for switching said control p-transistor, wherein said on/off transistor has a drain connected to said gate of said control p-transistor, wherein a source of said on/off transistor is connected to the ground reference;

a first inverter, having an input supplied with an input signal, wherein said first inverter has an output connected to a gate of said on/off transistor; and

a speed-up circuit, having an output connected to said gate of said control p-transistor, wherein said input signal is supplied to an input of said speed-up circuit, and wherein said speed-up circuit has a capacitive coupling.

4. The high-side transistor driver as claimed in claim 1, wherein said n-transistor is turned on and said high-side transistor is switched off whenever said control p-transistor is turned on.

5. The high-side transistor driver as claimed in claim 1, wherein said current sink is utilized to turn on said p-transistor and switch on the high-side transistor whenever

said control p-transistor is turned off.

6. The high-side transistor driver as claimed in claim **3**, wherein said first current source is utilized to charge up a parasitic capacitor of said on/off transistor and turn off said control p-transistor.

7. The high-side transistor driver as claimed in claim **3**, wherein said on/off transistor is turned off whenever said input signal is high.

8. The high-side transistor driver as claimed in claim **3**, wherein said speed-up circuit generates a differential signal in response to said input signal, and wherein said differential signal accelerates the charge-up of said parasitic capacitor of said on/off transistor and accelerates the turn-on of the high-side transistor.

9. The high-side transistor driver according to claim **3**, wherein said speed-up circuit comprises:

an accelerative p-transistor, having a source connected to said floating-supply terminal, wherein said accelerative p-transistor has a drain connected to said output of said speed-up circuit;

a second current source, connected from said floating-supply terminal to a gate of said accelerative p-transistor;

a second diode, having an anode connected to said floating-ground terminal, wherein said second diode has a cathode connected to said gate of said accelerative p-transistor;

a third diode, connected in series with said second diode, wherein said third diode has a cathode connected to said floating-supply terminal, and wherein said third diode has an anode connected to said gate of said accelerative p-transistor;

a capacitor, for switching said accelerative p-transistor; and

a second inverter, having an input connected to said input of said speed-up circuit, wherein said capacitor is connected from an output of said second inverter to said gate of said accelerative p-transistor.

10. The high-side transistor driver according to claim **9**, wherein said accelerative p-transistor will charge up said parasitic capacitor of said on/off transistor whenever said accelerative p-transistor is turned on.

11. The high-side transistor driver according to claim **9**, wherein said accelerative p-transistor is turned on within a time-constant, wherein the length of the time-constant is proportional to the product of the amplitude of the current from said second current source and the capacitance of said capacitor.